New Zealand Public Health Report

ISSN 1173-0250 Volume 7 Number 1/2 January/February 2000

Directions for public health in New Zealand in the new millennium

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New Zealand has experienced a steady decline in mortality of approximately 1% a year over the last half-century, an improvement that owes much to broader societal advance, including public health initiatives. Yet New Zealand's record is a mediocre one. The funding and recognition for public health remains meagre and many features of the public health system function well short of full effectiveness. An assessment of evidence from the 'burden of disease' project underlines the continuing importance of addressing established causes of death. However, non-fatal outcomes can now be seen to be of key significance, particularly mental health, the health status of the elderly, and the discrepancies between Maori and non-Maori. Key strategies are identified as securing the statutory independence and recognition of the public health function; enhancing surveillance and intelligence gathering; developing interventions guided by data on health inequalities, avoidable mortality, and risk factors; fostering community-based health promotion initiatives; setting performance objectives for public health; and renewing an underpinning philosophy for public health. In conclusion, it is argued that much can be achieved by implementing known preventive and surveillance activities, by reinvigorating the public health message, and by developing new models of health promotion, particularly in partnership with Maori.

Over the last half century, mortality has steadily declined in New Zealand by approximately 1% a year, falling from 855 per 100 000 in 1951 to 493 per 100 000 in 1996 (standardised for age and gender).[1] Although this rate of progress obscures the existence of persistent health inequalities between Maori and non-Maori, such an improvement in life chances, particularly for older New Zealanders and for Maori, over a period in which the population both doubled in size and aged significantly, is notable. Furthermore, such figures need to be placed in a global perspective of the estimated one billion people worldwide whose life experiences have advanced only slowly at the same time.[2]

All other developed countries have recorded significant advances as well. By one estimate, for example, the average life span of Americans increased by over 30 years during the 20th century, only about 5 years of which can definitively be attributed to the specific effects of improvements in medical care.[3] Although it is difficult to make direct connections between these advances and particular public health initiatives, it does seem that among the areas of greatest achievement have been vaccination (and infectious diseases more generally), motor-vehicle and workplace safety, coronary heart disease and stroke, food quality, reproductive, maternal and child health, fluoridation, and tobacco control.[4]

Yet for all this record of achievement, the recognition, funding and implementation of public health remains frustratingly meagre. Thus in most developed countries the proportion of health expenditure allocated to promotion and prevention activities is miserly, amounting to less than 2% in the New Zealand case (excluding personal preventive services delivered in primary care, but including surveillance and promotion of immunisation and technical support).[5] Furthermore, many of the disease prevention strategies of proven efficacy, such as vaccination, some screening programmes and tobacco control, function well short of full effectiveness within current delivery

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systems. Add to this the obdurate nature of health inequalities, the globalisation of many health issues, growing ideological and fiscal challenges to the welfare state, and potentially conflicting public/professional perceptions of risk, and the vision for public health in the new century is arguably a contested and uncertain one.

Public health challenges

Viewed in a comparative perspective, New Zealand's public health record appears to be a mediocre one. For example, both male and female all-cause mortality declined more rapidly in Australia and Canada over the period 1960 to 1994 and remains significantly lower.[1] Indeed, according to a recent review, "progress on a range of health status indicators has been mixed", health inequalities persist, and our international ranking on a range of measures has slipped relative to comparable countries.[6] Despite adopting a strategic approach to goal setting and implementation in public health,[7] and despite professed support at the highest political levels, there is little evidence that key stakeholders in New Zealand have taken up the opportunity to adopt or adapt this public health framework. In particular, the framework has had little influence on the activities of the personal health sector - as evidenced, for example, in the probable decline in immunisation rates, despite this being one of the most cost-effective strategies available.[8]

Against such a backdrop, what are the prospects for public health in the new millennium? The first requirement is to establish some basic parameters for the 'health of the public'. In essence we need to establish areas of need and the scope for health gain. As a preliminary to setting broader goals for policy, we need to establish the 'state of play' in health as a guide to policy direction and as a benchmark by which to judge the impact of our public health strategies. One tool to do this is the 'burden of disease' methodology. The Global Burden of Disease (GBD) project combines the impact of premature mortality with that of disability through a single, unifying measure, the disability-adjusted life year (DALY).[9] DALYs combine into a common metric time lost through premature death (82.5 years for women and 80 years for men) (YLL) and time lived with disability (YLD). The disability information can be 'added' to premature mortality by assigning values, disability weights, based on social preferences for different non-fatal health states. The measured disease burden is the gap between a population's health status and that of an optimal, and perhaps unrealistic, reference population.

The GBD project, and particularly the DALY measure, have been the subject of vigorous debate.[10] In part this is because of the heavy analytical requirements, partly it is because of the limitations of the basic data, and partly also because of some questionable assumptions, such as the lower productive value attributed to years lived in childhood and old age. Despite its deficiencies, the burden of disease approach gives us a much more solid evidence base for determining the future direction of public health effort. In New Zealand it appears that just three cause groups, cardiovascular disease, cancer and injury, account for over three-quarters of the total burden of premature mortality.[1] In the case of the non-fatal disease and injury burden, seven cause groups account for four-fifths of the total, the most important of which is mental illness. For the whole population of New Zealand in 1996, 55% of the total burden resulted from premature mortality and 45% from non-fatal outcomes. *Table 1* shows the distribution of the total burden of disease and injury of over half a million disability-adjusted life years in 1996.

Drawing on this information, therefore, it appears that the first set of public health challenges of the new century is not

Table 1: Burden of disease and injury, by cause group, 1996[1]

Cause group	Years of life lost (YLL)	Years lost due to disability (YLD)	Total disability-adjusted life years (DALYs)
Cardiovascular disease	109 781	26 563	136 344
Cancer	92 791	17 348	110 138
Mental illness	2230	62 740	64 970
Respiratory diseases	18 911	30 786	49 697
Injury	36 307	13 277	49 584
Neurosensory disorders	8354	32 869	41 223
Endocrine disorders	9911	16 856	26 767
Other chronic conditions	11 143	15 057	26 199
Infant disorders	12 986	8757	21 743
Infectious diseases	12 354	5916	18 270
Musculoskeletal disorders	1905	16 339	18 247
All groups	**316 674**	**246 509**	**563 183**

Note: 1 Data are adapted from reference 1, tables 64, 68 and 72.

going to be so novel. The familiar pattern of disease and injury will, in the first instance, present itself in the new century. But there are important qualifications to this conclusion that are suggested by the burden of disease methodology. There has been the tendency to give rather greater implicit weight in our public health strategies to the postponement of death over the prevention of illness. Using the common metric of the burden of disease methodology, suggests that the prevention of disability, illness and injury is as important a public health task as the reduction of premature mortality. About half the total burden of disease is attributable to morbidity, with mental illness the leading contributor to this morbidity. To date we have made little progress in developing feasible public health policies in the area of mental health.[11]

What the burden of disease information also shows is that those in the retirement years carry the disproportionate share. Forty percent of the combined fatal and non-fatal burden is carried by those over the age of 65. Again, we have not been particularly adept at developing and implementing preventive strategies for this group. Clearly there is a level of accumulated health disadvantage over the period of the life course we can do little to reverse.[12] However, the increase in the life span and the potential for the compression of morbidity in the later years provide an opportunity for increased efforts in prevention and health maintenance for this group.[13]

Finally, this information from the burden of disease exercise underscores the twin ethical imperatives of prevention and social equity. In the case of prevention, the DALY measure represents the loss of years of healthy life. This quantifies very explicitly the preventive task. Similarly, with social equity. The data from the New Zealand burden of disease estimates show that Maori lose DALYs at about 1.7 times the rate of non-Maori. Again, this provides a benchmark; in this instance, for assessing the role of social causation in structuring the pattern of preventable disease and injury. To the extent that such differences are due to social and behavioural factors that are not freely chosen by those who suffer these health disadvantages, they can be considered to be avoidable and thus unfair.[14]

Key strategies

In considering strategies for public health, it needs to be recognised in the first instance that most of the elements of an effective public health strategy are actually in place. The infrastructure and culture of public health practice remain intact - if not in robust health - despite a decade of almost constant system restructuring focussed almost entirely on personal health services and motivated principally by considerations of efficiency and financial viability.[15] Under such duress, the national focus of public health has been

weakened; first integrated into the broader system, then deintegrated, and now partially re-integrated again.[16] Basic systems of surveillance and information collection are in need of strengthening, funding systems need to be protected,[5] and the population health message requires revalidation alongside that of the much higher-profile personal health services. There is also a strong argument - arising from the need both to enhance sector leadership and to protect the integrity of advice - for reinforcing the statutory and actual independence of public health within the bureaucracy.[17]

These general considerations apart, what specific strategies will we need in the new century? The data from the burden of disease exercise for New Zealand, as elsewhere, suggests that most of the current priorities in public health are broadly valid. These priorities are likely to continue for the foreseeable future, but they will need to be amended in the light of the greater importance accorded in the new metric to non-fatal outcomes in general and to mental ill-health in particular. Thus, much of the current surveillance systems are organised around traditional infectious disease control, with noncommunicable disease activities significantly under-resourced. Similarly, existing data collection systems are at their strongest for traditional mortality statistics. In both cases the burden of disease exercise suggests that greater emphasis needs to be placed on non-fatal outcomes, particularly mental health.

However, it is possible to estimate from currently available data, areas in which interventions are most likely to pay off. One tool to identify these areas is that of 'avoidable mortality'. From existing information it is possible to estimate where different policies are likely to have the most impact.[1] Thus it has been estimated that possibly 70% of mortality in 1996-97 was 'avoidable' (slightly higher for Maori and Pacific Islands people); approximately half of which is estimated to be avoidable through primary prevention (healthy public policy and health promotion), another quarter through secondary (or disease) prevention (ie, early intervention, including, but not limited to, screening activities), and a further fifth through tertiary (or curative) prevention. The major causes of avoidable mortality at different ages are outlined in *Table 2*.

***Table 2: Major causes of avoidable mortality, by age and intervention category, 1996-97*[1]**

Age group (years)	Primary avoidable mortality	Secondary avoidable mortality	Tertiary avoidable mortality
< 1	Sudden infant death syndrome (SIDS) Low birth weight	Birth trauma Congenital anomaly	Congenital anomaly Low birth weight
1-14	Road traffic injury Fire	Epilepsy Other infections	Road traffic injury Leukemia
15-24	Road traffic injury Suicide	Suicide Epilepsy	Road traffic injury Suicide
25-44	Suicide Road traffic injury	Suicide Epilepsy	Road traffic injury Breast cancer
45-64	Ischaemic heart disease (IHD) Lung cancer	IHD Colorectal cancer	IHD Breast cancer
65-74	IHD Lung cancer	IHD Colorectal cancer	IHD Breast cancer

Note: 1 Data are adapted from reference 1, table 81.

Another approach is to consider the impact of risk factors. The eight major risk factors - smoking, alcohol, diet, exercise, diabetes, overweight, high blood pressure and cholesterol - account for a potential 40% of all reported deaths. Again, this information points to potential areas for health gain in future public health strategies.[1]

Aside from purely quantitative considerations, we need also to weigh the requirements to accommodate a growing Maori renaissance which is making itself felt in the health sector as elsewhere. Just as Maui Pomare and other leaders contributed to a distinctive pattern of health development among Maori through the 20th century,[18] so we should expect further evolution in the new millennium. The strategies Pomare developed placed great store on community leaders, linked health with socio-economic adversity, emphasised the important role of culture in health advancement, acknowledged the impact of political action, and established a strong network of community health workers. His prescriptions, together with the contribution of the Ottawa Charter,[19] point to the evolution of a future model of health promotion and development for Maori.[20]

Apart from the question of emphasis, there is also the issue of the integrity, robustness and performance of the public health system. While public health professionals in New Zealand might not see their own circumstances in the same light as the judgement passed on the United States system as one in 'disarray',[21] most practitioners would see merit in defining and monitoring the operation of core functions in public health.[22] If the criteria of essential public health services were applied in New Zealand, how would we measure up? At the very least, attention would need to be paid to strengthening the integrity and robustness of current surveillance, information and programme activities for the new century, and linking these to broader performance goals for the health system.

Just as fundamental as issues of system functioning are those of underpinning philosophy. At the heart of public health is a core of disease prevention and health promotion beliefs and activities that have achieved professional sanction and that have passed into the technical manuals of public health practitioners. But is there more to public health practice than information collection, outbreak investigation, maintaining disease prevention systems, monitoring and enforcing health protection and environmental health requirements, and some health promotion activities?

Certainly if you take the Ottawa Charter rhetoric at face value, interventions at the level of public policy are just as much part of public health practice as disease prevention and health education. Yet, such higher-level policy activities require substantial political commitment and social support.[23] Aside from the political and social mobilisation that is needed for public policy initiatives, a further requirement is for a plausible, persuasive and convincing analytical and empirical framework that can justify action. Too frequently this has been absent. Recently, however, much clearer analytical and empirical guidelines have come available that provide a more solid basis for action at the public policy level, both here in New Zealand[24] and internationally.[25,26] We are now in a much better position to argue for the higher-level, aspirational and inspirational goals of healthy public policy that can complete the picture for a rounded public health strategy.

Discussion

The burden of disease methodology provides us with an explicit set of quantitative estimates of where we might best direct our public health resources, although these need to be complemented by information on feasibility and cost-effectiveness and tested in the arena of public opinion. Apart from a suggested redirection of attention to non-fatal outcomes and to mental health priorities, there are few surprises here. Of necessity, the burden of disease approach anchors us very firmly in the empirical 'here and now'. It works by extrapolation. It cannot tell us what unexpected diseases and disorders we might anticipate in the new century. Nor can it assist us in assessing the quite different weights the public might place on the otherwise 'objective' facts of risk on which the methodology rests.

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Surveillance data

National surveillance data - October 1999

Disease[1]	Current year - 1999[2]			Previous year - 1998			Trends - October 1999
	Oct 1999 cases	Cumulative total year-to-date	Current rate[3]	Oct 1998 cases	Cumulative total year-to-date	Previous rate[3]	Percentage change[7] (-100% to 100%)
AIDS	0	28	0.7	6	30	0.8	
Acute gastroenteritis[4]	30	459	15.7	43	383	13.5	*
Campylobacteriosis	602	6302	243.3	901	9080	305.0	***
Cholera	0	1	0.1	0	0	0	
Creutzfeldt-Jakob disease	0	0	0	0	0	0	
Cryptosporidiosis	178	880	27.1	143	765	22.6	***
Dengue fever	1	9	0.3	3	23	0.7	*
Giardiasis	122	1561	51.2	143	1895	60.4	***
H influenzae type b disease	0	9	0.3	0	9	0.2	
Hepatitis A	5	111	3.6	6	125	4.5	
Hepatitis B (acute)[5]	7	84	2.7	10	76	2.4	
Hepatitis C (acute)[5]	9	82	2.9	8	78	2.8	
Hydatid disease	0	6	0.2	0	2	0.1	
Influenza[6]	7	798	22.1	5	438	12.4	***
Lead absorption	11	132	4.1	4	68	2.3	***
Legionellosis[6]	9	45	1.6	2	97	3.3	***
Leprosy	0	4	0.2	0	0	0.1	200
Leptospirosis	9	45	1.7	10	59	1.9	
Listeriosis	2	17	0.5	2	17	0.6	
Malaria	3	34	1.2	3	63	2.0	*
Measles	7	92	3.1	7	145	8.2	***
Meningococcal disease	44	431	13.7	27	375	13.1	
Mumps	4	48	1.6	4	74	2.3	*
Paratyphoid	1	11	0.4	3	12	0.4	
Pertussis	165	650	18.9	13	118	4.7	*** 301
Rheumatic fever	3	59	1.9	6	63	2.0	
Rubella	7	32	1.1	3	47	1.4	
Salmonellosis	146	1798	57.9	181	1772	53.8	*
Shigellosis	9	124	4.0	13	103	3.1	
Tetanus	0	4	0.1	0	2	0.1	
Tuberculosis	38	374	12.3	33	297	9.8	**
Typhoid	0	9	0.3	0	29	0.8	**
VTEC/STEC infection	8	59	1.8	0	42	1.2	*
Yersiniosis	33	412	13.5	39	470	15.4	*

Significance of difference: * $p<0.05$; ** $p<0.01$; *** $p<0.001$

Notes:
1. No cases of the following notifiable diseases were reported in October: anthrax, brucellosis, cysticercosis, diphtheria, meningoencephalitis - primary amoebic, plague, rabies, rickettsial diseases, taeniasis, trichinosis, viral haemorrhagic fever, or yellow fever
2. These data are provisional
3. Rate is based on the cumulative total for the current year (12 months to October 1999) or the previous year (12 months to October 1998), expressed as cases per 100 000
4. Cases with suspected common source, person in a high risk category (eg foodhandler, childcare worker, healthcare worker)
5. Only acute cases of this disease are currently notifiable
6. Surveillance data based on laboratory-reported cases only
7. Percentage change is the difference between the number of cases in the current year (12 months to October 1999) and the previous year (12 months to October 1998). This difference is expressed as a percentage of the number of cases seen in the previous year

Surveillance data

Surveillance data by health district - October 1999

Cases this month ☐ Current rate[1] ☐

Disease	Cases for October 1999,[2] and current rate[1,2] by health district[3,4]																							
	Northern				Midland								Central							Southern				
	Northland	NW Auck	Central Auck	South Auck	Waikato	Tauranga	Eastern BoP	Gisborne	Rotorua	Taupo	Taranaki	Ruapehu	Hawkes Bay	Wanganui	Manawatu	Wairarapa	Wellington	Hutt	Nelson-Marl	West Coast	Canterbury	South Cant	Otago	Southland
AIDS[3]	0				0								0							0				
	1.1				0.4								1.0							0.4				
Acute gastroenteritis	2	4	7	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	13	0	0	0
	16.8	20.3	28.1	13.5	1.3	2.7	2.0	100.5	3.1	0	4.7	0	4.2	0	0.7	0	7.4	2.3	4.3	6.2	55.6	6.3	0.6	3.6
Campylobacteriosis	16	69	55	49	89	5	4	6	10	4	22	1	20	3	14	8	57	20	15	8	46	23	39	19
	116.0	252.6	287.8	196.4	286.6	152.5	129.3	139.9	170.5	120.5	154.4	119.4	258.6	143.3	146.9	148.2	387.0	322.7	139.8	197.4	331.9	298.0	233.4	203.0
Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Creutzfeldt-Jakob disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptosporidiosis	4	7	4	1	21	5	0	2	0	0	8	0	18	4	14	6	3	0	5	0	44	16	8	8
	10.9	10.9	9.5	9.1	56.2	23.9	2.0	21.9	3.1	29.3	14.0	17.9	53.0	16.3	47.2	31.2	24.7	47.5	7.7	21.6	52.8	67.9	16.2	25.2
Dengue fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	0	1.0	1.4	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0.6	0
Giardiasis	1	13	17	6	18	5	1	1	2	2	2	0	13	0	6	0	2	4	2	0	14	0	10	3
	32.1	59.4	70.9	42.7	65.8	68.3	15.9	72.1	35.6	74.9	21.5	11.9	81.5	22.8	44.5	26.0	67.5	43.7	32.6	80.2	47.9	27.7	34.2	31.4
H influenzae type b disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0.8	0.6	0.3	0	0.9	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0	0.8	0	0	0
Hepatitis A	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	16.0	5.3	5.8	8.5	0.7	1.8	0	6.6	3.1	0	0	0	2.8	1.6	0	0	3.7	1.5	3.4	0	1.3	0	1.7	2.7
Hepatitis B	0	0	0	0	3	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0
	3.6	1.3	1.7	4.1	5.0	1.8	0	8.7	3.1	0	0	11.9	7.0	1.6	0.7	0	1.2	2.3	0.9	0	4.1	3.8	1.2	1.8
Hepatitis C	1	0	0	0	0	1	1	0	5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	2.2	0	1.4	0.3	0	16.0	4.0	0	15.5	0	0	0	1.4	0	0.7	0	1.6	1.5	0.9	6.2	11.9	6.3	2.3	0
Hydatids	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0.3	0	0	0.9	0	0	0	0	0	0	0	0	0	5.2	0	0	0.9	0	0	0	0.6	0
Influenza[5]	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0
	1.5	18.0	29.8	35.4	31.7	0.9	33.8	10.9	4.6	3.3	10.3	0	7.0	13.0	3.3	10.4	11.1	0	18.0	9.3	62.6	22.6	13.3	8.1
Lead absorption	0	0	0	0	2	0	0	0	0	0	1	0	1	0	0	2	0	0	0	0	2	2	1	0
	3.6	0.8	2.6	0.6	5.3	3.5	2.0	8.7	7.7	0	4.7	0	9.8	0	4.7	7.8	3.3	2.3	0.9	12.3	8.8	17.6	1.7	2.7
Legionellosis[5]	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5	0	0	0
	0	0	2.3	0	5.9	0	0	0	0	0	1.9	0	0	1.6	1.3	5.2	1.2	3.8	0	0	3.9	0	0.6	0
Leprosy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0.3	0.3	0.6	0	0	0	0	0	0	0	0	0	0	0.7	0	0	0.8	0	0	0	0	0	0
Leptospirosis	0	0	0	0	2	0	0	0	0	1	1	0	2	0	1	0	0	0	0	0	0	1	0	1
	8.0	0.5	0	0.3	3.3	0.9	0	4.4	1.5	6.5	1.9	0	6.3	3.3	1.3	5.2	0.8	0	2.6	3.1	0.5	5.0	0.6	0.9
Listeriosis	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	0.7	1.0	1.4	0.6	0.3	0	0	0	1.5	0	0	0	0	0	0	0	0.4	0	0	0	0.5	0	0	0
Malaria	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	1.5	0.8	0.9	0.9	2.0	0	0	2.2	3.1	0	0	6.0	0	6.5	1.3	0	0.4	0	2.6	0	2.6	0	1.7	0
Measles	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	2	0
	0.7	2.3	2.0	2.6	3.6	0.9	4.0	4.4	0	3.3	0	0	5.6	0	7.3	10.4	2.9	5.3	3.4	9.3	2.3	1.3	7.5	0.9
Meningococcal disease	0	4	9	8	4	1	0	0	1	0	2	0	1	1	0	0	1	2	0	0	5	1	4	0
	27.0	10.1	20.5	30.7	10.9	14.2	29.8	6.6	23.2	22.8	6.6	6.0	16.7	6.5	2.0	10.4	4.5	15.8	1.7	3.1	7.5	5.0	14.5	15.3
Mumps	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2.9	0	0.6	2.9	0.7	2.7	2.0	0	0	6.5	3.7	0	4.2	1.6	2.0	7.8	2.5	1.5	0	3.1	1.0	0	2.3	0.9
Paratyphoid	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.7	0.8	0.3	0.9	0.3	0	0	0	0	3.3	0	0	0	0	1.3	0	0.4	0	0	0	0.5	0	0	0
Pertussis	5	12	5	11	20	0	0	0	0	0	4	0	1	0	1	0	1	3	7	0	27	27	6	35
	8.0	5.6	2.6	4.4	14.9	1.8	0	0	0	0	10.3	0	9.8	0	0.7	0	18.1	8.3	44.6	0	19.1	85.5	20.8	242.5
Rheumatic fever	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7.3	0	2.0	4.1	2.0	2.7	0	17.5	4.6	3.3	0.9	11.9	0.7	0	0	2.6	2.9	2.3	0	0	0	0	0	0
Rubella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	4	0
	2.2	0.8	0.6	0.9	0	1.8	0	0	0	0	0	0	1.4	0	0.7	2.6	1.2	0	2.6	6.2	1.0	1.3	4.6	0
Salmonellosis	1	9	14	7	14	1	2	3	3	1	5	1	12	0	5	3	9	3	9	1	12	7	14	10
	38.7	51.7	48.9	41.3	59.8	50.5	31.8	59.0	43.4	123.8	44.9	71.6	50.2	26.1	94.4	78.0	82.7	76.2	43.7	37.0	67.0	75.4	55.6	73.7
Shigellosis	1	2	2	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
	6.6	4.3	13.3	9.1	2.6	0.9	0	0	9.3	3.3	0.9	0	0	1.6	2.7	0	1.2	2.3	0.9	0	1.8	2.5	0	1.8
Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	2.2	0	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0.6	0.9
Tuberculosis	2	3	7	8	2	1	1	0	0	0	0	0	1	0	0	0	8	4	0	0	1	0	0	0
	19.0	8.6	29.5	22.5	10.2	13.3	6.0	6.6	7.7	9.8	0	0	12.5	1.6	5.3	0	20.2	16.6	4.3	3.1	6.2	6.3	2.9	6.3
Typhoid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.7	0.5	0.6	0.9	0	0.9	0	0	0	0	0	0	0	0	0	0	0	1.5	0	0	0	0	0	0
VTEC/STEC infection	0	0	1	0	2	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0
	0	0	1.2	0.3	10.9	4.4	2.0	2.2	1.5	0	1.9	0	0	0	0.7	2.6	2.1	1.5	0	0	1.3	1.3	1.2	0
Yersiniosis	2	3	7	4	2	0	0	0	0	1	0	0	1	0	0	0	4	1	0	2	5	1	0	0
	8.8	14.7	16.2	11.7	12.2	6.2	8.0	15.3	12.4	16.3	6.6	0	16.0	1.6	4.7	2.6	20.6	13.6	6.0	37.0	24.3	33.9	1.2	4.5

Notes: 1 Current rate is based on the cumulative total for the last 12 months expressed as cases per 100 000
2 These data are provisional
3 AIDS data given by divisions of the Health Funding Authority
4 Further data are available from the local medical officer of health
5 Surveillance data based on laboratory-reported cases only

Surveillance data

National surveillance data - November 1999

Disease[1]	Current year - 1999[2]			Previous year - 1998			Trends - November 1999
	Nov 1999 cases	Cumulative total year-to-date	Current rate[3]	Nov 1998 cases	Cumulative total year-to-date	Previous rate[3]	Percentage change[7]
AIDS	6	33	0.9	1	30	0.8	
Acute gastroenteritis[4]	67	528	16.5	38	421	12.2	***
Campylobacteriosis	817	7120	232.0	1226	10306	313.2	***
Cholera	0	1	0.1	0	0	0	
Creutzfeldt-Jakob disease	0	0	0	0	0	0	
Cryptosporidiosis	73	953	27.2	69	834	23.2	***
Dengue fever	0	9	0.3	1	24	0.7	*
Giardiasis	120	1681	50.0	164	2059	61.2	***
H influenzae type b disease	0	9	0.3	0	9	0.2	
Hepatitis A	4	115	3.6	5	130	4.1	
Hepatitis B (acute)[5]	3	87	2.6	6	82	2.4	
Hepatitis C (acute)[5]	8	90	2.7	16	94	2.9	
Hydatid disease	2	8	0.2	0	2	0.1	→ 300
Influenza[6]	3	801	22.2	2	440	12.2	***
Lead absorption	12	144	4.3	6	74	2.3	***
Legionellosis[6]	11	56	1.7	6	103	3.0	***
Leprosy	1	5	0.2	1	1	0.1	→ 200
Leptospirosis	4	49	1.5	10	69	2.1	
Listeriosis	0	17	0.5	0	17	0.6	
Malaria	6	40	1.2	6	69	2.0	**
Measles	9	100	3.2	5	150	5.4	***
Meningococcal disease	40	469	13.9	31	406	12.7	
Mumps	3	51	1.6	5	79	2.2	*
Paratyphoid	0	11	0.4	1	13	0.4	
Pertussis	188	839	23.8	14	132	4.4	*** → 434
Rheumatic fever	5	64	1.9	2	65	1.9	
Rubella	3	34	1.0	4	51	1.5	
Salmonellosis	169	1965	59.0	130	1903	55.1	*
Shigellosis	12	135	4.0	9	112	3.3	
Tetanus	1	5	0.1	0	2	0.1	→ 150
Tuberculosis	42	414	12.4	34	331	10.1	**
Typhoid	0	9	0.2	2	31	0.9	***
VTEC/STEC infection	3	62	1.8	2	44	1.3	
Yersiniosis	47	459	13.7	39	509	14.9	

Percentage change axis: -100% -75% -50% -25% 0% 25% 50% 75% 100%

Significance of difference: * $p<0.05$ ** $p<0.01$ *** $p<0.001$

Notes:
1. No cases of the following notifiable diseases were reported in November: anthrax, brucellosis, cysticercosis, diphtheria, meningoencephalitis - primary amoebic, plague, poliomyelitis, rabies, rickettsial diseases, taeniasis, trichinosis, viral haemorrhagic fever, or yellow fever
2. These data are provisional
3. Rate is based on the cumulative total for the current year (12 months to November 1999) or the previous year (12 months to November 1998), expressed as cases per 100 000
4. Cases with suspected common source, person in a high risk category (eg foodhandler, childcare worker, healthcare worker)
5. Only acute cases of this disease are currently notifiable
6. Surveillance data based on laboratory-reported cases only
7. Percentage change is the difference between the number of cases in the current year (12 months to November 1999) and the previous year (12 months to November 1998). This difference is expressed as a percentage of the number of cases seen in the previous year

Surveillance data by health district - November 1999

Cases this month | Current rate[1]

Disease	Cases for November 1999,[2] and current rate[1,2] by health district[3,4]																							
	Northern				Midland								Central							Southern				
	Northland	NW Auck	Central Auck	South Auck	Waikato	Tauranga	Eastern BoP	Gisborne	Rotorua	Taupo	Taranaki	Ruapehu	Hawkes Bay	Wanganui	Manawatu	Wairarapa	Wellington	Hutt	Nelson-Marl	West Coast	Canterbury	South Cant	Otago	Southland
AIDS[3]	5				0								1							0				
	1.4				0.4								1.1							0.8				
Acute gastroenteritis	1	10	10	6	5	0	0	0	0	0	8	0	0	0	0	0	1	1	1	0	22	2	0	0
	15.3	21.1	29.8	14.6	3.0	2.7	2.0	85.2	3.1	0	12.2	0	4.2	0	0.7	0	7.8	3.0	5.1	6.2	57.9	8.8	0.6	3.6
Campylobacteriosis	20	107	89	69	83	13	3	6	11	3	18	2	33	17	14	12	72	28	18	4	86	43	48	18
	117.4	247.1	266.4	190.5	276.0	144.5	99.4	133.3	167.4	107.5	150.7	119.4	257.9	153.0	132.3	163.8	356.1	293.3	143.2	172.7	308.6	320.6	231.1	185.1
Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Creutzfeldt-Jakob disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptosporidiosis	2	3	0	0	11	2	1	1	0	0	3	0	5	0	4	1	6	3	0	0	6	14	6	5
	12.4	11.7	9.0	9.1	57.8	23.9	4.0	19.7	1.5	16.3	15.0	6.0	55.8	14.7	43.9	33.8	22.6	49.0	7.7	18.5	52.5	81.7	16.8	21.6
Dengue fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	1.0	1.2	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0.6	0
Giardiasis	4	7	21	12	16	6	2	0	1	0	4	0	8	2	1	1	12	2	4	1	11	0	3	2
	30.6	55.3	70.0	40.4	66.1	68.3	17.9	63.4	37.2	74.9	24.3	11.9	84.3	22.8	41.9	28.6	64.2	36.9	35.2	74.0	47.9	27.7	34.7	28.7
H influenzae type b disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0.8	0.6	0.3	0	0.9	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0	0.8	0	0	0
Hepatitis A	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
	16.0	5.6	5.5	8.2	1.0	0.9	0	6.6	3.1	0	0	0	2.1	1.6	0.7	0	4.1	1.5	2.6	0	1.3	0	1.7	2.7
Hepatitis B	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3.6	1.3	1.4	4.1	5.0	1.8	0	6.6	3.1	0	0	11.9	6.3	1.6	0.7	0	1.2	2.3	0.9	0	4.1	3.8	1.2	1.8
Hepatitis C	0	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	1	0	0
	2.2	0.3	1.4	0.6	0	16.0	4.0	0	12.4	0	0	0	1.4	0	0.7	0	2.1	0.8	0.9	6.2	9.6	7.5	2.3	0
Hydatids	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	0	0	0.3	0	0	0.9	0	2.2	0	0	0	0	0	0	0	5.2	0.4	0	0.9	0	0	0	0.6	0
Influenza[5]	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
	1.5	18.0	29.8	35.4	32.1	0.9	33.8	10.9	4.6	3.3	10.3	0	7.0	13.0	3.3	10.4	11.1	0	18.0	9.3	62.6	22.6	13.3	8.1
Lead absorption	0	0	1	1	5	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	1	0	1	0
	3.6	0.8	2.6	0.9	6.9	3.5	2.0	8.7	7.7	0	4.7	0	9.8	0	4.7	7.8	3.7	2.3	0.9	12.3	8.8	16.3	1.7	2.7
Legionellosis[5]	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	2	1	1	0	0	3	0	0	0
	0	0	1.7	0	5.9	0.9	0	0	0	0	1.9	0	0	1.6	1.3	10.4	1.2	4.5	0	0	4.7	0	0.6	0
Leprosy	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0.3	0.9	0	0	0	0	0	0	0	0	0	0	0.7	0	0	0.8	0	0	0	0	0	0
Leptospirosis	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0
	7.3	0.5	0	0.3	3.0	0.9	0	4.4	1.5	6.5	2.8	0	5.6	1.6	2.0	0	0.8	0	1.7	3.1	0.3	6.3	0	0.9
Listeriosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.7	1.0	1.4	0.6	0.3	0	0	0	1.5	0	0	0	0	0	0	0	0.4	0	0	0	0.5	0	0	0
Malaria	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2	0
	1.5	0.3	1.4	0.6	1.7	0	0	2.2	3.1	0	0	6.0	0.7	6.5	1.3	0	0.4	0	2.6	0	2.3	0	2.9	0
Measles	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	1	0	2
	0.7	2.3	2.3	2.9	3.6	0.9	2.0	4.4	0	3.3	0	0	5.6	0	6.6	10.4	3.3	4.5	3.4	9.3	2.3	2.5	7.5	2.7
Meningococcal disease	2	6	4	7	2	1	1	2	5	0	0	0	1	0	1	0	2	0	0	0	2	0	2	2
	27.7	11.4	20.2	31.3	10.9	14.2	27.8	10.9	26.3	22.8	5.6	6.0	14.6	6.5	2.7	10.4	5.4	14.3	0.9	3.1	7.8	5.0	13.9	16.2
Mumps	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	2.9	0	0.9	2.6	0.3	2.7	2.0	0	1.5	6.5	3.7	0	4.2	1.6	2.0	2.6	2.5	1.5	0	3.1	1.0	0	2.3	0.9
Paratyphoid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.7	0.8	0.3	0.9	0.3	0	0	0	0	0	0	0	0	0	1.3	0	0.4	0	0	0	0.5	0	0	0
Pertussis	2	26	8	11	18	2	0	0	0	0	2	0	3	0	0	0	1	6	12	0	51	6	18	22
	9.5	11.9	4.6	7.3	18.8	3.5	0	0	0	0	13.1	0	11.8	0	0.7	0	18.5	12.8	51.5	0	32.3	93.0	30.7	262.3
Rheumatic fever	2	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
	8.8	0	2.0	4.1	1.7	3.5	0	15.3	4.6	3.3	1.9	11.9	1.4	0	0	2.6	2.9	2.3	0	0	0	0	0	0
Rubella	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	2.2	0.8	0.6	0.9	0	0.9	0	0	0	0	0	0	1.4	0	0.7	2.6	1.2	0	2.6	6.2	0.8	0	4.6	0.9
Salmonellosis	2	15	12	11	12	6	0	1	1	1	2	0	7	3	12	2	23	7	9	0	9	8	10	16
	37.2	53.5	49.7	41.6	58.5	52.3	29.8	61.2	43.4	127.0	44.0	65.7	52.3	27.7	93.8	83.2	89.7	79.2	48.0	37.0	64.2	80.5	56.2	79.1
Shigellosis	1	1	2	3	0	0	0	0	2	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0
	7.3	4.1	13.3	9.7	2.3	0.9	0	0	9.3	3.3	0.9	0	0	1.6	2.7	2.6	1.6	2.3	0	0	1.8	2.5	0	1.8
Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	2.2	0	0	0	0	0	0	0	2.6	0.4	0	0	0	0	0	0.6	0.9
Tuberculosis	0	6	9	9	2	1	1	0	0	0	0	0	1	1	2	0	1	4	0	0	4	0	1	0
	19.0	10.4	28.3	22.8	10.9	13.3	6.0	6.6	6.2	9.8	0	0	13.2	4.9	6.0	0	18.1	18.1	4.3	3.1	6.7	5.0	3.5	4.5
Typhoid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.7	0.5	0.3	0.6	0	0.9	0	0	0	0	0	0	0	0	0	0	0	1.5	0	0	0	0	0	0
VTEC/STEC infection	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	1.2	0.3	11.6	4.4	0	2.2	1.5	0	1.9	0	0	0	0.7	2.6	2.1	1.5	0	0	1.3	1.3	1.2	0
Yersiniosis	2	6	7	5	2	2	1	0	1	0	1	0	1	1	0	0	3	3	0	0	9	0	0	3
	9.5	15.0	16.8	13.2	12.2	7.1	8.0	13.1	13.9	16.3	7.5	0	16.7	3.3	4.0	2.6	18.9	15.8	5.1	33.9	24.1	31.4	1.2	6.3

Notes: 1 Current rate is based on the cumulative total for the last 12 months expressed as cases per 100 000
2 These data are provisional
3 AIDS data given by divisions of the Health Funding Authority
4 Further data are available from the local medical officer of health
5 Surveillance data based on laboratory-reported cases only

Surveillance data

National surveillance data - December 1999

Disease[1]	Current year - 1999[2]			Previous year - 1998			Trends - December 1999
	Dec 1999 cases	Cumulative total year-to-date	Current rate[3]	Dec 1998 cases	Cumulative total year-to-date	Previous rate[3]	Percentage change[7] (significance)
AIDS	2	34	0.9	1	28	0.8	
Acute gastroenteritis[4]	51	584	16.1	70	491	13.6	**
Campylobacteriosis	1004	8135	224.8	1274	11580	320.0	***
Cholera	0	1	0	1	1	0	
Creutzfeldt-Jakob disease	0	0	0	0	0	0	
Cryptosporidiosis	23	976	27.0	32	866	23.9	*
Dengue fever	0	9	0.2	2	26	0.7	**
Giardiasis	106	1788	49.4	127	2186	60.4	***
H influenzae type b disease	1	10	0.3	2	11	0.3	
Hepatitis A	4	119	3.3	16	145	4.0	
Hepatitis B (acute)[5]	6	93	2.6	7	89	2.5	
Hepatitis C (acute)[5]	5	95	2.6	8	102	2.8	
Hydatid disease	0	8	0.2	0	2	0.1	300
Influenza[6]	1	802	22.2	1	441	12.2	***
Lead absorption	8	151	4.2	10	84	2.3	***
Legionellosis[6]	8	67	1.9	6	109	3.0	***
Leprosy	1	7	0.2	1	2	0.1	250
Leptospirosis	6	55	1.5	6	75	2.1	
Listeriosis	1	18	0.5	0	17	0.5	
Malaria	4	44	1.2	4	73	2.0	**
Measles	7	107	3.0	14	164	4.5	***
Meningococcal disease	40	507	14.0	33	439	12.1	*
Mumps	6	57	1.6	6	85	2.3	*
Paratyphoid	1	12	0.3	3	16	0.4	
Pertussis	205	1042	28.8	21	153	4.2	*** 581
Rheumatic fever	1	65	1.8	6	71	2.0	
Rubella	3	37	1.0	2	53	1.5	
Salmonellosis	116	2081	57.5	168	2071	57.2	
Shigellosis	12	147	4.1	10	122	3.4	
Tetanus	1	6	0.2	0	2	0.1	200
Tuberculosis	39	452	12.5	36	367	10.1	**
Typhoid	0	9	0.2	0	31	0.9	***
VTEC/STEC infection	2	64	1.8	4	48	1.3	
Yersiniosis	43	502	13.9	37	546	15.1	

Significance of difference: * p<0.05, ** p<0.01, *** p<0.001

Notes:
1. No cases of the following notifiable diseases were reported in December: anthrax, brucellosis, cysticercosis, diphtheria, meningoencephalitis - primary amoebic, plague, poliomyelitis, rabies, rickettsial diseases, taeniasis, trichinosis, viral haemorrhagic fever, or yellow fever
2. These data are provisional
3. Rate is based on the cumulative total for the current year (12 months to December 1999) or the previous year (12 months to December 1998), expressed as cases per 100 000
4. Cases with suspected common source, person in a high risk category (eg foodhandler, childcare worker, healthcare worker)
5. Only acute cases of this disease are currently notifiable
6. Surveillance data based on laboratory-reported cases only
7. Percentage change is the difference between the number of cases in the current year (12 months to December 1999) and the previous year (12 months to December 1998). This difference is expressed as a percentage of the number of cases seen in the previous year

Surveillance data

Surveillance data by health district - December 1999

Cases this month | Current rate[1]

Disease	Cases for December 1999,[2] and current rate[1,2] by health district[3,4]																							
	Northern				Midland								Central							Southern				
	Northland	NW Auck	Central Auck	South Auck	Waikato	Tauranga	Eastern BoP	Gisborne	Rotorua	Taupo	Taranaki	Ruapehu	Hawkes Bay	Wanganui	Manawatu	Wairarapa	Wellington	Hutt	Nelson-Marl	West Coast	Canterbury	South Cant	Otago	Southland
AIDS[3]	1				0								1							0				
	1.4				0.4								1.2							0.4				
Acute gastroenteritis	0	7	3	3	4	0	0	0	0	0	2	0	0	0	0	0	2	1	0	0	28	0	0	1
	15.3	19.0	26.3	12.3	5.6	2.7	2.0	85.2	1.5	0	9.4	0	4.2	0	0	0	8.2	3.8	5.1	6.2	60.0	8.8	0.6	4.5
Campylobacteriosis	24	98	84	72	104	15	3	10	14	6	16	2	99	9	22	13	79	37	29	5	122	32	71	38
	120.4	231.3	246.7	177.4	266.7	134.8	99.4	129.0	164.3	117.3	150.7	107.4	287.8	140.0	123.7	179.4	326.5	257.1	152.6	160.4	304.7	329.4	249.6	198.5
Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Creutzfeldt-Jakob disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptosporidiosis	0	0	0	0	1	0	1	0	0	0	0	0	2	0	4	1	3	2	0	0	4	2	1	2
	12.4	11.4	9.0	8.8	57.8	23.9	6.0	17.5	1.5	16.3	13.1	6.0	57.1	11.4	42.6	33.8	23.5	49.0	6.0	12.3	53.0	76.7	16.8	22.5
Dengue fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0.8	0.9	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0.6	0
Giardiasis	2	17	18	7	17	2	2	1	1	1	0	2	7	0	1	0	5	4	2	2	8	3	4	2
	29.9	56.8	71.4	40.7	67.8	66.5	19.9	39.3	34.1	68.4	24.3	17.9	86.4	19.5	40.6	26.0	62.2	33.9	35.2	77.1	46.8	26.4	33.0	29.6
H influenzae type b disease	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0.5	0.6	0.3	0	0.9	0	0	0	0	0.9	0	0	0	0	0	0	0	0	0	0.8	0	0	0
Hepatitis A	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
	10.9	5.1	5.8	7.3	0.7	0.9	0	6.6	3.1	0	0	0	2.1	1.6	1.3	0	4.1	1.5	1.7	0	1.3	1.3	1.2	2.7
Hepatitis B	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	0	1	0	0	0
	3.6	1.0	1.4	3.8	5.0	1.8	0	4.4	3.1	3.3	0	6.0	6.3	1.6	0.7	0	1.6	3.0	1.7	0	3.9	3.8	1.2	1.8
Hepatitis C	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
	2.9	0.3	1.4	0.6	0	14.2	4.0	0	12.4	0	0	0	1.4	0	0.7	0	1.6	0.8	0.9	6.2	9.1	7.5	2.9	0
Hydatids	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0.3	0	0	0.9	0	2.2	0	0	0	0	0	0	0	5.2	0.4	0	0.9	0	0	0	0.6	0
Influenza[5]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	1.5	18.0	29.8	35.4	31.4	0.9	33.8	10.9	4.6	3.3	10.3	0	7.0	13.0	3.3	10.4	11.1	0	18.0	9.3	62.1	22.6	13.3	8.1
Lead absorption	0	0	2	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	3	0	0	0
	3.6	0.8	2.6	0.9	7.3	0.9	2.0	4.4	7.7	0	3.7	0	10.5	0	4.7	7.8	4.1	2.3	0.9	12.3	9.1	16.3	1.7	1.8
Legionellosis[5]	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0
	0	0	1.4	0	6.3	0.9	0	0	0	3.3	1.9	6.0	1.4	1.6	2.0	10.4	1.2	4.5	0	0	4.4	0	0.6	0.9
Leprosy	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	0	0	0.3	0.9	0	0	0	0	0	0	0	0	0.7	0	0.7	0	0	0.8	0	0	0	0	0	0
Leptospirosis	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1	0	1	0
	6.6	0.5	0	0.3	2.6	0.9	0	4.4	1.5	3.3	3.7	0	5.6	1.6	2.0	0	0.8	0	0.9	6.2	0.5	6.3	0.6	0.9
Listeriosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
	0.7	1.0	1.4	0.6	0.3	0	0	0	1.5	0	0	0	0	0	0.7	0	0.4	0	0.9	0	0.5	0	0	0
Malaria	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0
	1.5	0.3	1.4	0.9	1.7	0	0	2.2	1.5	0	0	6.0	0.7	8.1	1.3	0	0.4	0	2.6	0	2.3	0	2.9	0
Measles	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	2	0
	0	2.0	2.3	2.9	1.3	0.9	2.0	4.4	0	3.3	0	0	5.6	0	6.6	10.4	3.3	4.5	3.4	9.3	2.8	2.5	7.5	2.7
Meningococcal disease	1	5	6	6	4	1	1	1	1	0	1	0	3	0	0	0	1	1	0	0	5	0	1	2
	28.4	12.2	20.2	32.2	10.9	14.2	23.9	13.1	27.9	22.8	6.6	6.0	13.9	6.5	1.3	10.4	5.8	12.8	0.9	0	8.8	2.5	12.7	18.0
Mumps	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0
	1.5	0	1.2	2.6	0	1.8	0	0	3.1	9.8	3.7	0	4.2	1.6	2.0	2.6	2.1	1.5	0.9	3.1	1.3	0	2.9	0.9
Paratyphoid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	0.7	0.5	0	0.9	0.3	0	0	0	0	0	0	0	0	0	1.3	0	0.4	0	0	0	0.5	0	0	0
Pertussis	2	29	8	13	4	2	0	2	0	0	3	0	2	2	0	0	6	1	15	0	75	22	7	12
	10.9	19.3	6.9	11.1	17.8	5.3	0	4.4	0	0	15.0	0	13.2	3.3	0.7	0	21.0	12.8	54.0	0	51.5	119.4	34.7	273.1
Rheumatic fever	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9.5	0	2.0	3.5	1.7	3.5	0	15.3	4.6	3.3	0.9	6.0	0.7	0	0	2.6	2.5	2.3	0	0	0	0	0	0
Rubella	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	2.2	1.3	0.6	0.9	0	0.9	0	0	0	0	0	0	1.4	0	0.7	2.6	1.2	0	2.6	6.2	0.3	0	5.2	0.9
Salmonellosis	3	13	9	7	6	1	0	2	4	0	0	1	9	1	0	3	10	6	6	0	17	4	10	3
	37.9	53.3	49.5	40.7	57.8	50.5	23.9	61.2	44.9	52.1	42.1	71.6	53.0	27.7	81.8	91.0	85.6	78.4	49.7	37.0	64.7	80.5	58.5	77.3
Shigellosis	2	1	2	4	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	8.8	3.6	12.1	10.8	2.3	0.9	0	2.2	9.3	3.3	0.9	0	0	1.6	2.7	2.6	1.6	3.0	0	0	1.6	2.5	0	1.8
Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	2.2	0	0	0	0	0.7	0	0	2.6	0.4	0	0	0	0	0	0.6	0.9
Tuberculosis	0	2	6	5	3	2	0	0	0	0	0	0	1	0	1	0	8	4	1	0	4	0	2	0
	19.0	10.4	28.3	22.2	10.9	11.5	6.0	6.6	4.6	6.5	0	0	13.2	4.9	6.6	0	18.9	20.4	5.1	3.1	7.0	3.8	4.1	4.5
Typhoid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.7	0.5	0.3	0.6	0	0.9	0	0	0	0	0	0	0	0	0	0	0	1.5	0	0	0	0	0	0
VTEC/STEC infection	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	1.2	0.3	10.9	4.4	0	2.2	1.5	3.3	1.9	0	0	0	0.7	2.6	2.1	1.5	0	0	1.3	0	1.2	0
Yersiniosis	1	3	4	10	5	0	0	0	0	0	1	0	3	0	0	0	5	3	0	0	5	2	1	0
	10.2	14.2	17.4	15.8	12.9	7.1	8.0	13.1	12.4	16.3	7.5	0	17.4	3.3	4.0	2.6	18.1	16.6	3.4	33.9	23.3	31.4	1.7	6.3

Notes: 1 Current rate is based on the cumulative total for the last 12 months expressed as cases per 100 000
2 These data are provisional
3 AIDS data given by divisions of the Health Funding Authority
4 Further data are available from the local medical officer of health
5 Surveillance data based on laboratory-reported cases only

Continued from page 3

As important as any more explicit quantification of where public health resources need to be directed, however, is attention to the system that delivers those resources. In many respects we have to hand the information and the expertise that are capable of addressing a wide range of public health problems, but they are not necessarily effectively or fully implemented. Clearly the quantitative assessment of public health need is one thing; forging and maintaining a system and a workforce capable of delivering on those needs is another. We could do much by merely implementing effectively what we currently know by way of disease prevention and surveillance, with adequately managed and resourced national systems.[27] Furthermore, much more could be achieved by harnessing the activities of practitioners involved in the delivery of personal services to wider public health goals.

For members of the public health workforce, the GBD information suggests a reorientation towards issues of morbidity and disability, particularly in mental health. This should be allied to the enhancement of the existing public health infrastructure, to the renewal and reinvigoration of an underpinning vision, and to the development of new models of health promotion in partnership with Maori. For medical practitioners involved in the delivery of personal clinical services, there should be an expectation of a much stronger infrastructure to support them in their preventive activities, including assistance in linking their work to broader public health objectives. Furthermore, the secondary and tertiary avoidable mortality data in *Table 2* point to significant health gains to be made in particular areas of general and specialist medical practice.

Aside from the functioning core of the infrastructure of conventional public health activities, there is also the wider picture, the vision of the good society to which public health practitioners believe they are contributing. The Ottawa Charter provided a framework that was able to encompass both the practical and the visionary in public health practice. To a very large degree, the loftier, inspirational elements of public health have been lost in the more market-driven, technocratic model that has inspired the wave of health reform. Crucial to the future of public health in the new millennium will be a recapturing of that vision and a reclaiming of its rightful place in the health system alongside the personal health services. An important dimension to this will be the development of models of health promotion that relate not only to the traditional functions of the state, but also to the evolving partnership with Maori.

Acknowledgements: We wish to thank Ann Richardson, the editors, and several anonymous reviewers, for their helpful comments on earlier drafts.

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New Zealand Public Health Report is produced monthly by ESR for the Ministry of Health.
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